

## ABSTRACT

Multi-domain, phase-compensated, differential-coherence detection of photonic signals for interferometric processes and devices may be manufactured holographically and developed in situ or with an automatic registration between holograms and photonic sources in a single frame. Photonic or electronic post processing may include outputs from a cycling or rotation between differently phased complementary outputs of constructive and destructive interference. A hyper-selective, direct-conversion, expanded-bandpass filter may rely on an expanded bandpass for ease of filtering, with no dead zones for zero beat frequency cases. A hyper-heterodyning, expanded bandpass system may also provide improved filtering and signal-to-noise ratios. An ultra-high-resolution, broadband spectrum analyzer may operate in multiple domains, including complex “fingerprints” of phase, frequency, and other parameters. The associated technologies of the invention may be used to produce extreme precision in multi-domain locking of sophisticated waveforms varying in several domains. Phase-masking techniques may provide phased arrays of complementary outputs over a broad band, such as may be implemented in a projected phase-mask, multiple phase interferometer. Topographic holographic imaging and projection techniques are enabled at very fine resolutions, while minimizing required information for systems such as holographic television. Phase-stabilization, modulation, compensation and the like are enabled by devices and methods in accordance with the invention, and may be servo-controlled.

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